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WELL DEVELOPMENTS

No. X Board of Water Well Contractors September 1990

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GROUNDWATER HEAT PUMPS

The question of jurisdiction over groundwater heat pumps has been discussed by the Board of Water Well Contractors. The following is the legal opinion issued by the board's attorney, Fred Robinson. If you have any questions concerning this opinion, please contact the board office in Helena.

Issue

Does the board have jurisdiction over wells drilled for the installation of groundwater heat pump systems?

Facts

Groundwater heat pump wells involve drilling holes to the groundwater. Usually, a pump is installed, and groundwater is pumped to the surface and run through a heat exchanger. The used water is then discharged wherever law and practicality dictate. However, there is a less common system that does not draw water from the earth. With these systems, fluid is circulated through a closed loop that extends down into a capped well. Heat is exchanged between the fluid in the loop and the water in the well.

Applicable Statutes

37-43-302. License Required. *. . . . it is unlawful for any water well contractor, water well driller, or monitoring well constructor as defined in this chapter, to construct, alter, or rehabilitate a water well or a monitoring well without first having obtained a valid license . . . .*

37-43-102. Definitions. *. . . .*

(7) "Water well" means an excavation that is drilled, cored, bored, washed, driven, dug, jetted, or otherwise constructed and intended for the location, diversion, artificial recharge, or acquisition of groundwater. . . .

Conclusion

The board has jurisdiction over the drilling of wells for groundwater heat pump systems.

Discussion

Generally, groundwater heat pump wells do not differ significantly from common water wells. Therefore, the board's jurisdiction over this type of well is clear. The issue is less clear with the closed loop system because groundwater is not withdrawn from the well. However, the definition of *"water well"* does not require that water be withdrawn from the well. Rather, the definition only requires that the well be intended for the *"location, diversion, artificial recharge, or acquisition of groundwater."* The board can interpret drilling a well into the groundwater for the purpose of exchanging heat with the water in the well as fitting this definition.

REQUIRED TRAINING

On August 17, 1990, ARM 36.21.413A REQUIRED TRAINING became effective.

On June 15, 1990, a public hearing was held in Helena on the board's proposed rule to make training mandatory for license renewal for water well contractors, drillers, and monitoring well constructors. The rule was adopted by the board as proposed, and all licensees must have a minimum of four hours per year of approved training. This requirement will be effective for the 1991 renewals.

Any training proposal requires prior board approval. Forms for reporting training attendance will be available within the next month from the board office. In the meantime, if you have a training program you wish to attend, please contact the board office in Helena for approval. You will need to list the course instructor, content of the training, and dates. If you have a copy of the program, please submit it also.

Attending the Northern Rocky Mountain Water Congress, which will be held in Butte September 30 through October 5, 1990, will count as approved credit toward the training. Sessions attended must total four hours to fully meet the training requirement. You will need to have the session moderators verify the sessions you attend. The forms to be signed should also be available by the end of September. In addition, Diana Cutler, program specialist for the Board of Water Well Contractors, will be at the congress and can answer any questions you may have regarding the credit.

The congress course program and preregistration form were mailed to you previously. In addition, an article on the congress appears in this newsletter along with a registration form. If you have any questions about credit or the congress itself, you can contact Diana at the board office in Helena, (406) 444-6643 or Kathleen Miller at Montana Tech, (406) 496-4154.

MONITORING WELL LOG REPORTS

Are you aware that Well Log Reports are required by board rule on all monitoring well installations? The Board of Water Well Contractors has stated that the reports of the engineers are acceptable. However, the legal land description needs to be as accurate as possible. The Montana Bureau of Mines and Geology, which is compiling a data base on monitoring wells, would like to see the legal description down to 100 feet, more or less, of the well. In those instances where there are a series of monitoring wells installed in a given area, this degree of accuracy will narrow down the location and pinpoint the wells. A diagram showing the actual well construction should be included, as well as detailed formation reporting.

KALISPELL FIELD OFFICE PROFILE

The Kalispell Field Office of the Water Rights Bureau, Department of Natural Resources and Conservation (DNRC), is located just south of Kalispell at 3220 Highway 93 South, in the Treweek Building. Its service area includes Flathead, Lake, Lincoln, and Sanders counties.

Charles F. Brasen has been with the Department of Natural Resources and Conservation since March 1978. For the past 10 years Chuck, as field manager of the Kalispell Field Office, has dealt mainly with the processing of water use permit applications that receive objections and the administrative duties of the Kalispell Field Office. Prior to that time he was an engineer with the DNRC Powder River water rights adjudication in Broadus. Chuck brought with him experience as a working ranch foreman on a diversified central Montana grain and cattle ranch and a degree in civil engineering from Montana State University (MSU).

Leading the Kalispell Field Office adjudication program is Judy Jeniker, water resources specialist III. Judy started with the Department of Natural Resources and Conservation in the Kalispell Field Office in January 1980. Judy mainly provides supervision to the program, does claim examination, and provides assistance and information to the public and the Montana Water Court. Judy brought with her a degree in bacteriology from MSU and experience in hydrometallurgical engineering and water quality studies with a mining firm. Judy has been active in many local Flathead Valley organizations.

Heading up the Kalispell Field Office new appropriations program is Dave Schmidt, water resources specialist III. Dave started with the Department of Natural Resources and Conservation in Helena in April 1977. Dave provides supervision to the program, reviews new appropriation applications, and does field investigations for water use, dam safety, and Board of Water Well Contractors (BWWC) activities. Dave has a degree in geology/geography from the University of Montana (UM) and experience in the Helena, Missoula, Lewistown, and Kalispell water right field offices.

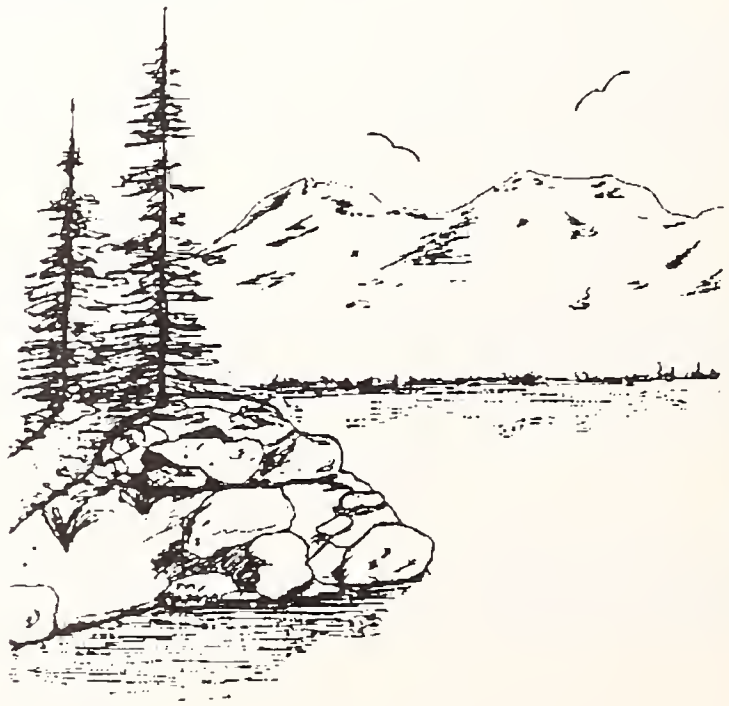
Rich Russell, water resources specialist II, has been with the Kalispell Field Office since August 1978. Rich started with the new appropriations program, but switched to the adjudication program during the claim filing period. Since July 1987 Rich has kept busy processing new appropriation applications, especially small groundwater applications, doing permit verification, and helping the public. Rich has taken several continuing education courses at Flathead Valley Community College, including Geology of Northwest Montana and some computer courses.

Al Russell, water resources specialist II, has been with the Kalispell Field Office since June 1980. Al is in the new appropriations program. Al processes new appropriation applications and water right transfer forms, does permit verification, and assists the public. Al brought with him degrees in sociology and education and a variety of experience in the Montana environmental area.

Linda Colter, program assistant I, started with the Kalispell Field Office as a clerk typist in December 1980. She accepted a full-time position as a general office clerk with the Kalispell Field Office in May 1981. Linda handled the receptionist and clerical duties and provided records research assistance until her position was reclassified as a program assistant I. She is now additionally involved in the processing of water right transfer forms, small groundwater applications, and a myriad of other duties that make this office an efficient and orderly DNRC field office.

Because of the amount of water rights work in the area, the Kalispell Field Office duties have mostly been limited to water-right-related functions (that is, new appropriations and adjudication activities). There has been occasional field work done for the BWWC, the DNRC Water Management Bureau, and the DNRC Dam Safety Program.

Chuck and the Kalispell Field Office staff encourage anyone to visit and see what is available and what the Kalispell Field Office can do for you.



Northern Rocky Mountain Water Congress

During the first week of October, Butte will play host to several groups of scientists, engineers, and representatives of government agencies as the site of a joint meeting of the Northern Rocky Mountain Water Congress and the 1990 Mineral and Hazardous Waste Processing Symposium. More than 100 technical papers and panel discussions will be presented from October 1 through October 5. Participants in the meeting will also be able to join in field trips to Superfund sites, operating mines, and processing plants. Exhibits by manufacturers, suppliers, and consultants will be available in the pool area of the Copper King on October 2, 3, and 4. Some of the exhibitors will also be sponsoring coffee breaks and cocktail receptions.

The Northern Rocky Mountain Water Congress is a presentation of combined conferences, symposiums, and workshops featuring topics on hazardous waste problems of metal and organic-substance contamination and treatment; methods of water resource protection including proper well construction, surface water and groundwater management, and techniques of resource appraisal; legislative and educational programs; mine-water problems; aspects of public health including radon and pesticides; and Superfund and other Environmental Protection Agency (EPA) programs. The Mineral and Hazardous Waste Processing Symposium (October 2 and 3) is sponsored by the Advanced Minerals and Hazardous Waste Processing Center of Excellence, the Hazardous Substance Research Center, EPA Regions 7 and 8, the Montana Mining and Mineral Resources Research Institute, and the Montana College of Mineral Science and Technology. Other groups sponsoring parts of the week-long program are the Montana Bureau of Mines and Geology, the Montana Chapter of the American Water Resources Association, the Montana Board of Water Well Contractors, the Montana Department of Agriculture, and the Montana Environmental Health Association.

On Wednesday, October 3, the Board of Water Well Contractors will be meeting at 9:30 A.M. Bill Osborne of Liberty Drilling in Kalispell will be the luncheon speaker at noon Wednesday. Bill will talk and present slides about his experience as a consultant for a U.S. Aid Project to secure water for villagers in Lesotho, South Africa. He will also present a talk on iron bacteria in wells on Thursday, October 4, at 8:15 A.M.

On Wednesday afternoon, papers will be presented that relate to well sealing and completion. A panel discussion will be held on the pros and cons of consistency of rules throughout the drilling industry for well completions and abandonment. The complete program is being mailed to you by the Program Committee of the Northern Rocky Mountain Water Congress.

A preregistration form follows. Luncheon and banquet fees will be separate from the registration fees. Tickets can be purchased when you pick up your registration packets. For further information on activities and events, contact Terry Noyd (496-4318) or Kathleen Miller (496-4154) at Montana Tech.

Detach here

NORTHERN ROCKY MOUNTAIN WATER CONGRESS REGISTRATION

Please enroll me in the **NORTHERN ROCKY MOUNTAIN WATER CONGRESS:**
Name: Mr.__/Ms.__ _____
Title: _____
Company/Agency: _____
Address: _____
City: _____ State: _____ Zip: _____

REGISTRATION:
$30 by **September 15,** 1990
$50 after **September 15,** 1990

I will attend the following concurrent field trip ($10 includes lunch)
_____ **ANACONDA-WARM SPRINGS AREA (Super Fund sites and gold mine)**
_____ **BUTTE AREA (Super Fund sites and copper molybdenum mine)**
_____ I would like to participate in both field trips.
Thursday scheduling of same two field trips is dependent upon number of registrants interested in both.

I will attend the Post-Water Congress two-day field trip
($89 transportation and lodging - space is limited)
_____ **YELLOWSTONE NATIONAL PARK** - October 6 and 7

Send this registration form, with a check payable to:
MT TECH - N ROCKY MTN WATER CONGRESS
c/o Brenda C. Sholes, Hydrology Division
Montana Bureau of Mines and Geology
Butte, Montana 59701
Telephone (406) 496-4152

NAME: _____
will attend the Spouses' Program ($10 each day - includes lunch)
_____ **MONDAY - BUTTE ATTRACTIONS**
_____ **TUESDAY - COPPER KING MANSION AND ARTS CHATEAU**
_____ **WEDNESDAY - DEER LODGE AREA**
_____ **THURSDAY - HELENA- STATE CAPITOL**

$_____ **REGISTRATION**
$_____ **FIELD TRIP(S)**
$_____ **SPOUSES' PROGRAM**
$_____ **YELLOWSTONE NP TRIP**

I will attend the **AWRA Pig Roast** Tuesday
_____ Number attending (Everyone welcome)

$_____ **TOTAL AMOUNT ENCLOSED**

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MONITORING WELLS ARE DIFFERENT FROM DRINKING WATER WELLS - - and so are the regulations

The following article was contributed by Nicholas Bugosh, hydrologist with the Water Quality Bureau of the Department of Health and Environmental Sciences.

Monitoring well construction standards have been adopted (ARM 36.21.801-810) to set minimum specifications for licensed monitoring well constructors to use. The standards were created because it was observed that often the way monitoring wells were being constructed limited their usefulness for gathering the desired information. The problem was that experienced water well drillers often completed monitoring wells in a manner that would be acceptable for a drinking water well, but not for a monitoring well. This article will discuss some of the important differences between these two types of wells and review key points that licensed monitoring well constructors will want to remember.

The purpose of a drinking water well is to **provide potable water** in a useful quantity to the well user. This is very different from the purpose of a monitoring well. The purpose of a monitoring well is to **provide information**. The information can be of many types: the baseline water quality or groundwater flow direction in an area potentially subject to some sort of development, operational water quality monitoring to determine if a development is degrading groundwater quality, definition of a contaminant plume, and definition of aquifer properties are a few of the common types.

Monitoring well completion can vary substantially depending upon the type of information sought by the hydrogeologist. For example, a monitoring well installed to show if a facility is leaking cyanide may be completed in the first water-bearing zone beneath the potential source (pond, heap leach pad, etc.). This zone by itself may provide only a very small quantity of water to the well, perhaps 2 gallons per minute (gpm) or less. Normally, a water well driller would drill through this zone looking for a better yield. A useful water yield is not the purpose of the monitoring well; detecting leakage of cyanide to groundwater as soon as possible is the purpose. The monitoring well constructor would complete the well in this first, low yield zone.

The purpose of the monitoring well, as well as the formation drilled through, can dictate the drilling method employed. If the purpose is to locate the first distinct water-bearing zone, a driller using drilling fluids may not detect a low yield aquifer. He may have to modify his method by using air and pausing periodically to see if water is flowing into the hole. In this example, the monitoring well constructor is able to complete the well in the desired first water-bearing zone by modifying his methods.

Because well completion methods are so critical in determining whether a monitoring well will produce the desired information, a detailed well log is essential. The well log should note in great detail any changes in the rock type. If the size or shape of a gravel changes, the depth should be noted on the log. If the color of a rock changes, it should be noted. If the drill suddenly runs easily or, conversely, suddenly begins to bounce and chatter, the log should record it. Any change in the formation observed by the monitoring well constructor should be recorded on the log. Even subtle changes can be very useful information to the hydrogeologist trying to understand the aquifer. The log should contain a clear, cross-sectional drawing showing how the well was completed. The drawing should include the screened interval, location of any filter packs, packers, seals, surface casings, and other construction details. This record of well completion is needed to verify that the well is capable of monitoring the desired aquifer, for the desired purpose. The record may also be useful in the future to determine if the well can be used for another monitoring purpose.

It has also been observed that monitoring wells have been completed improperly because the client requests the driller to deviate from the appropriate monitoring well design criteria. For example, a client may request that the monitoring well constructor complete a monitoring well so that it may also be used as a water production well. In this case, it is the monitoring well constructor's responsibility to inform the client that this deviation from the specifications may not meet the primary purpose of the monitoring well. Remember, it is your license that is on the line. When an unauthorized deviation from the monitoring well specifications is discovered, it can mean loss of your license. At the very least, it will mean that you have to redrill the monitoring well correctly, probably at your own cost. In instances like this, the monitoring well constructor also has a responsibility to the agency requiring the monitoring well installation. The agency should be informed that the client is soliciting bids on well designs that do not meet monitoring well criteria. The information obtained from these specialized wells can have a wide range of serious implications, from public health consequences to planning decisions that will affect Montana's well-being for generations to come. The monitoring well constructor has a critical role in ensuring that the well is completed as designed.

The last point to be made is that, because these standards are new, it is understood that there will be a period of adjustment until even seasoned water well drillers are familiar with the variety of completion methods, drilling techniques, and records required in successful monitoring well construction. It is suggested that the monitoring well constructor contact the agency requiring the wells, as well as the hydrologic consultant on the project, **before** drilling to ensure the completion specifications will result in a well suitable for the desired monitoring task. The monitoring well constructor is a vital part of the team producing information from the aquifer; his cooperation is essential to the project success.

For further information
on any of the material
contained herein contact:
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